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MOVING LIGHTS VERSUS STATIONARY LIGHTS IN PHOTOTROPISM EXPERIMENTS.

Recently, the writer had the opportunity of witnessing the operation of a machine designed to capture the adults of injurious species of insects. A light was used to attract the insects, and on flying near the burner a powerful suction of air created by a gasoline engine whirled them into an inner chamber with such force as to kill the softer ones and cripple the harder species such as beetles and grasshoppers. The machine was mounted on a truck which was drawn along the edges of the fields of a sugar plantation. Whether it is really efficient has not been determined, and as it is not now being operated there has been no further opportunity to observe it in action.

It was noted that considerable numbers of moths of *Diatraea saccharalis* and *Laphygma frugiperda*, especially gravid females, were attracted by the light. As these species are seldom found at trap lights which have been operated at Audubon Park for several years, it would seem that there must be a difference between these lights and the light used in the machine. As lights of various intensities and colors have been tried at Audubon Park, however, the writer believes that the difference lies not in the lights themselves but in the fact that the lights at the Park are stationary while the light on the machine is moved about from place to place among the fields and thus attracts one group of insects after another. In fact, the attraction of group after group could very readily be noted. When the insects were abundant the truck was stopped for one or two minutes, and when the cloud of insects had disappeared, either settling again or being sucked into the machine, the mules were started and the machine was driven a few yards further on. Possibly, the mere motion of the light exercised some attraction which stationary lights do not possess. Other possible factors are the noise of the gasoline engine and the walking of the mules and operators of the machine through the grass, the noise and the general disturbance probably causing more insects to fly than would have been attracted solely by the light. T. E. Holloway.

NATHAN BANKS GOES TO CAMBRIDGE.

Nathan Banks has resigned from the service effective November 1 to accept a position as Curator in the Museum of Comparative Zoology of Cambridge. Mr. Banks has been in the service since 1890 with the exception of a period of five years ending in 1897. His wide knowledge of the literature, and of the taxonomy of various groups of insects have made him a highly valued member of the corps. Unfortunately, for some little time at least, he will not be able to carry on systematic work and make determinations. He states that his new position is that of a curator, and he expects to be fully occupied with "curating."

LIVE SPECIMENS DESIRED.

The cowpea weevil (*Bruchus* [*Pachymerus*] *chinensis*):

The pink cornworm (*Batrachedra rileyi*)

Dr. F. H. Chittenden, of the Bureau of Entomology, will appreciate sendings of the above-mentioned species. Pack in box with food sufficient to insure arriving in healthy condition.

THE NEW FEDERAL EMPLOYEES' COMPENSATION ACT.

The new Federal Employees' Compensation Act, approved by the President on September 7, 1916, applies to all civilian employees of the United States Government. The Employees' Compensation Commission created by that Act has not yet been appointed. Until such time as the Commission has organized and is ready to take up the duties described by the Act, all injuries occurring during the discharge of official duties on and after September 7, will be reported by the Honorable Secretary of Agriculture to the Honorable Secretary of Labor, Washington, D. C. In each case where the disability lasts for more than **three days**, the injured employee will be given an opportunity to make a claim for compensation on account of such injury, if he so desires. All claims for compensation, and all reports of injuries, will be filed with the United States Employees' Compensation Committee upon its organization.

Notification of injury should be filed with the Secretary of Agriculture within 48 hours after the accident and statements of witnesses secured before they leave the vicinity in which the injury was sustained.

[The preceding paragraphs are abstracted from a letter from the Secretary of Labor to the Secretary of Agriculture under date of October 9, 1916.]

The following extracts from the Act will make its general provisions clear:

Sec. 2. xxx During the first 3 days of disability the employee shall not be entitled to compensation. xxx.

Sec. 3. If disability is total the United States shall pay to the disabled employee during such disability a monthly compensation equal to 66-2/3 per centum of his monthly pay. [Exceptions to this stated.]

Sec. 4. xxx. If disability is partial the United States shall pay to the disabled employee during such disability a monthly compensation equal to 66-2/3 per centum of the difference between his monthly pay and his monthly wage earning capacity: i. e. If he is off duty the first 15 days and works the last 15 days, he receives 66-2/3 per centum of the first 15 days and full pay for the last 15 days.

Sec. 6. xxx The monthly compensation for total disability shall not be more than \$66.67 nor less than \$33.33 unless the employee's monthly pay is less than \$33.33, in which case his monthly compensation shall be the full amount of his monthly pay.

The monthly compensation for partial disability shall not be more than \$66.67.

Sec. 10. xxx If death results from injury within 6 years the United States shall pay to his beneficiary a monthly compensation equal to certain percentages of his monthly pay. subject to the modification that no compensation shall be paid where the death takes place more than one year after the cessation of disability resulting from injury, or, if there has been no disability preceding death, more than one year after the injury.

The above section 10 quoted also specifies a certain percentage to (a) a widow if there is no child; (b) to a widower if there is no child; (c) to a widow or widower; (d) to the children; (e) to the parents; (f) to brothers, sisters, grandparents, and grandchildren.

Sec. 15. xxx. Every employee injured in the performance of his duty, or some one on his behalf, shall, within 48 hours after the injury, give written notice thereof to the immediate superior of the employee. Such notice shall be delivered in person, or by depositing it properly stamped and addressed, in the mails.

Sec. 16. That the notice shall state the name and address of the employee, the year, month, date, and hour when, and the particular locality where the injury occurred, and the cause and nature of the injury, and shall be signed by and contain the address of the person giving the notice.

Sec. 17. That unless the notice is given within the time specified or unless the immediate superior has actual knowledge of the injury, no compensation shall be allowed, but, for any reasonable cause shown, the commission may allow compensation if the notice is filed one year after the injury.

Sec. 18. xxx. No compensation under this Act shall be allowed to any person, except as provided in Section 38 (which refers to compensation paid under a mistake of law or of fact) unless he or someone on his behalf shall, within the time hereinbefore specified, make a written claim therefor. [It would be well for all employees to secure a copy of this Act and read it for their own information. The Act is known as Public----No. 267----- 64th Congress. H. R. 15316. "AN ACT TO PROVIDE COMPENSATION FOR EMPLOYEES OF THE UNITED STATES SUFFERING INJURIES WHILE IN THE PERFORMANCE OF THEIR DUTIES AND FOR OTHER PURPOSES," and may be obtained by inclosing 5 cents to the Superintendent of Documents, Washington, D. C.]

LIBRARY

Miss Mabel Golcord, Librarian.

NEW BOOKS.

- Bailey, L. H. The standard cyclopedia of horticulture. v.5.P-R. N.Y., 1916.
- Banks, Nathan Neuropteroid insects of the Philippine Islands. Manila, 1916.
(Philippine Jour. Sci. vol.XI, No.3, Sec.D. p.195-217, pl.I-II, May, 1916.)
- Carpenter, G. H. The Apterygota of the Seychelles. Dublin, 1916. 70p. 17pl.
(Proc. Royal Irish.Acad. vol.XXXIII, Sec.B, No. 1)
- Fletcher, T. B. One hundred notes on Indian insects. Calcutta, 1916. 39p.
illus. (Agr.Research Inst. Pusa, India. Bul. 59)
- Froggatt, W. W. & Froggatt, J. L. Sheep-maggot flies no.2. Sydney, 1916. 30p.
illus. (New South Wales Dept. Agr. Farmers' Bul. 110)
- Gough, L. H. Note on a machine to kill Gelechia larvae by hot air and the effects of heat on Gelechia larvae and cotton seed. Cairo, 1916. 18p. 3pl. (Egypt. Min.Agr.Tech. & sci. service. Bul.no.6. Entom.Section)
- Nuttall, G. H. F. Les tiques du Congo Belge et les maladies qu'elles transmettent. Londres, 1916. 51p. illus., fold.pl. (Belgium.Min. des colonies. Service de l'agriculture. Etudes de biol.agricole. no. 2)
- Osborn, Herbert & Drake, C. J. The Tingitoidea of Ohio. Columbus, 1916. (Ohio Biol.Surv. Bul. 8 (Ohio State Univ. Bul. v.20, no.35, p. 217-251)
- Porchinskii, I. A. Wohlfahrtia magnifica Schin. Sa biologie et son rapport a l'homme et aux animaux domestiques. 114p. illus. 2 pl. (Russia- Bureau of Entomology. Trudy v.11, no.9, 1916)
- Redia, giornale di entomologia. v.11, fasc.1-2. Firenze, 1916.
- Sladen, F. W. L. Bees and how to keep them. Ottawa, 1916. 56p. illus. 4pl.
(Canada-Dept.Agr.Dominion Exp.Farms Bul.ser. 2, no. 25)

Storey, G. List of Egyptian insects in the collection of the Ministry of Agriculture. Cairo, 1916. 52p. (Egypt.Min.Agr.Tech. & sci. service, Bul.no. 5. Entom.Section)

Storey, G. Simon's hot-air machine for the treatment of cotton seed against pink boll worm. Cairo, 1916. 10p. (Egypt.Min.Agr.Tech. & sci. service. Bul.11. Entom.Section)

Van Duzee, E. P. Check list of the Hemiptera (excepting the Aphididae, Aleurodidae) and Coccidae) of America, north of Mexico. N.Y., 1916. 111p.

BEE CULTURE

E. F. Phillips, In Charge.

Arrangements have been completed for extension work in beekeeping in Tennessee in cooperation with the State College of Agriculture and Cyrus E. Bartholomew, formerly of the Iowa State Agricultural College, has been appointed to conduct this work. Mr. Bartholomew will report for duty November first.

The cooperative extension work in beekeeping, with the Office of Extension Work in the South of this Department, will begin about November 1. Kenneth Hawkins has been appointed for this work.

Dr. E. F. Phillips went to Chicago on October 23, to complete arrangements for part of the extension work. He also went to Amherst, Mass., October 30 to consult the Associate Professor of Beekeeping at the Massachusetts Agricultural College concerning future work on bee diseases.

DECIDUOUS-FRUIT INSECT INVESTIGATIONS

A. L. Quaintance, In Charge.

A. J. Flehut, engaged in the investigation of chestnut weevils is now carrying on some experimental work in Pennsylvania with various fumigants against these insects.

Dwight Isely has completed his field work on the grape berry moth for the season at North East, Pa., and will spend the winter months in Washington, summarizing his notes and the preparation of reports.

H. B. Scammell, engaged in cranberry insect investigations, has changed his headquarters from Brown Mills, N. J., to Toms River, N. J., at which latter place better opportunities are offered for the investigation of certain cranberry insects.

R. J. Fiske, engaged in codling moth investigations, with headquarters at Roswell, N. M., has just returned to his headquarters from an inspection trip in the fruit growing sections of the Sacramento and Oregon Ranges and the Rio Grande Valley.

FEDERAL HORTICULTURAL BOARD.

C. L. Marlatt, Chairman.

(In Cooperation with the Bureau of Entomology.)

FEDERAL HORTICULTURAL BOARD.

Information was received from J. G. Sanders, the new Economic Zoologist of Pennsylvania, that the shipment of chestnut nursery stock from nurseries in that state to points outside of that state has been prohibited by the Pennsylvania State authorities.

D. G. Tower, formerly in the Bureau of Entomology, in the Office of Tropical and Subtropical Fruit Insect Investigations, has been transferred to the Federal Horticultural Board, and will be stationed at the Port of New York to assist H. B. Shaw in the inspection of plant imports, and to inspect and supervise the disinfection of imported cotton. The pathological inspection service has been increased by the appointment of Dr. W. H. Weston, Jr., from the Western Reserve University, who will be stationed in Washington.

Among the interesting items of interception of plant pests during the month may be mentioned an unrecognized lepidopterous larva taken in avocado seeds from Guatemala; adults of an unidentified beetle taken in the rhizomes of ferns from Guatemala; and an unidentified weevil taken from palm seed from Guatemala, and what appears to be an injurious weevil, *Anthonomus* sp., taken in Prunus seed from Japan..

FOREST INSECT INVESTIGATIONS

A. D. Hopkins, In Charge.

F. C. Craighead has returned from an inspection of the park and shade trees in the cities of Wilmington, N. C., Atlanta and Marietta, Ga., Knoxville and Chattanooga, Tenn. The most serious trouble was found to be with the oaks which have been dying for the past two or three years. The principal factors concerned in the death of these trees are large root borers (*Prionus* sp.) associated with a parasitic disease of the roots, also certain barkbeetles in the larger branches. Experiments have been started at the Eastern Field Station to determine the direct relation of these root borers to the dying of the oaks. It is requested that field men who have an opportunity to be present when oaks or chestnuts are taken out by the roots to look for these borers and send them to F. C. Craighead at East Falls Church, Va. They should be sent alive in tin cans containing earth.

SOUTHERN FIELD CROP INSECT INVESTIGATIONS

W. D. Hunter, In Charge.

W. D. Pierce and F. L. McDonough were engaged during the month in the determination of the spread of the cotton boll weevil.

G. D. Smith, who is stationed at Thomasville, Ga., was in Washington for a conference on October 26.

J. L. Webb, who has been stationed at Topaz, Calif., in work on live stock pests for several weeks, has returned to Washington.

W. E. Dove has closed the season's work at Aberdeen, S. Dak., and has returned to Dallas, Texas.

During the months a distinguished party of South Carolinians visited Louisiana and parts of Mississippi for the purpose of obtaining first-hand information regarding the boll weevil. The party was headed by Governor Manning and included the President of the A. and M. College, the Director of the Experiment Station, and Chairman of the Board of Trustees of Clemson College, and representatives of the State Bankers' and Cotton Seed Crushers' Associations, and several others. It was accompanied throughout its trip by W. D. Hunter. The party made a thorough study, especially with reference to the steps which can be taken in South Carolina, to avoid the losses and demoralizations which have practically invariably followed in the wake of the boll weevil. It is anticipated that the full report of the Commission, which is to be written by Doctor Riggs, President of Clemson College, will be an historic document.

TROPICAL AND SUBTROPICAL INSECT INVESTIGATIONS
C. L. Marlatt, In Charge.

J. R. Horton, who for the past six months has been studying the role of the Argentine ant in citrus groves in Southern California, has returned to Washington to prepare his general studies of the Argentine ant in relation to citrus cultures for publication.

Dr. E. A. Back has during the summer completed his report on the Mediterranean fruit fly (*Ceratitis capitata*) investigations in Hawaii, and this report has been submitted for publication. Dr. Back has left for Spain on a personal trip, to be gone four months, but in the meantime expects to be able to make some observations and do some work which will be of advantage to the Federal Government in relation to the fruit fly.

Mr. Pemberton, who is now in charge of the Fruit Fly Experiment Station in Hawaii, reports some very interesting biological interrelations between the different imported parasites, bearing particularly on the problem of the interference of these parasites with each other. He also reports some rather promising work with sprays against the melon fly (*Bactrocera cucurbitae*).

A. D. Borden is conducting a cooperative experiment, with the Maryland Agricultural Experiment Station, in the greenhouse control of the rose midge.

TRUCK CROP AND STORED PRODUCT INSECT INVESTIGATIONS
F. H. Chittenden, In Charge.

NOTE ON FUMIGATION.

In a recent fumigation, October 14, 1916, of the insectary, main building, two jars containing 6 pounds of cyanid of sodium were used for the top floor. The rooms contained a considerable accumulation of old beehives and useless material. Although the building remained open 17 hours, from 6:00 P. M. of the 15th until 11:00 A. M. of the following day, a strong odor of hydrocyanic acid persisted in the room, evidently more or less held by the large amount of dead air space in and about the hives. The weather outside was extremely still, practically no breeze blowing, which, no doubt, accounts for the lingering of the gas in such strength in the room fumigated.

A NEW GREENHOUSE.

A new greenhouse is in the course of construction. It is modeled after the first one constructed for this branch of the Bureau in 1914, and is to be used for fumigating different forms of insects affecting cucumber and related plants, tomatoes, lettuce, beans, and other truck plants grown under glass under different conditions of light, moisture and temperature.

STORED-PRODUCT INSECTS.

During the autumn the usual number of complaints have been received of insects injurious to stored leguminous seed. In the case of dried cowpeas, the four-spotted bean weevil (*Bruchus* [*Paehynotus*] *quadrimaculatus* Fab.) is usually present. The cowpea weevil (*Bruchus* [*Paehynotus*] *chinensis* L.) which was very abundant in past years is conspicuous by its absence. Living specimens of this species are

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desired for special study, and any employee of the Bureau who can obtain them and send to this office will confer a favor.

In former years, and especially lat year, numerous complaints were received of insects injurious to corn in the South. This fall more complaints are received of insects injurious to wheat than hitherto for obvious reasons. The granary weevil (*Calandra granaria* L.) is frequently the cause of the trouble. Various flour beetles are also troublesome to grains of all kinds.

The pink corn-worm (*Batrachedra rileyi* Wals.) has also made its appearance in stored corn in the South. Employees of the Bureau stationed in the Gulf region will greatly oblige by sending this species in for determination and further investigation. It is considered in Department Bulletin No. 363.

CEREAL AND FORAGE INSECT INVESTIGATIONS
W. R. Walton, In Charge.

The laboratory at Maxwell, N. Mex., will be abandoned December 1 next. D. J. Caffrey now in charge at that point will be transferred to the Tempe, Ariz. Station. G. W. Barber, formerly located at the Maxwell station was transferred to Wellington, Kans., October 1.

On December 1 the Greenwood, Miss. Station will be discontinued. C. F. Turner will be transferred to the West Lafayette, Ind. laboratory to assist in the Hessian-fly campaign. J. M. Langston, Mr. Turner's present assistant will be transferred to the field station located at Forest Grove, Oregon.

Irving R. Crawford who was attached temporarily to the Wellington, Kans. field station, returned to his studies October 15.

NEWS ITEMS FROM THE HAGERSTOWN (MD.) FIELD STATION.

The light trap has been run at this station every night throughout the summer with but few exceptions when heavy storms interfered. The first appearance of the cotton-worm moths (*Alabama argillacea*) was September 28 when 7 moths were collected at the trap-light. No other flights of this insect have been observed at this point. On the same date, 11 army-worm moths (*Cirphis unipuncta*) were taken, which is this season's last record for this moth.

A cheap apparatus for the control of environmental factors for experimental work with insects has been constructed at this station and has proved quite satisfactory. The apparatus consists of a galvanized iron box 10" x 14" x 24" with soldered joints and hinged glass door on one side, which accommodates a self-recording thermohygrograph. In one end is a small sliding door for the introduction of the material to be experimented upon and a small hole near the bottom for the introduction of the tube from the drying apparatus. In the top is a small hole for the introduction of moisture apparatus and another for the thermostat. In the other end near the top is a hole in which a funnel has been soldered to serve as an air exhaust. A circulation of air is forced through the drying apparatus, which consists of a series of jars containing sulphuric acid and calcium oxide, by suction produced with a small electric fan working in a blower in front of the air exhaust funnel. The entire chamber is supported on an iron frame. The temperature is regulated by a gas thermostat and a Bunsen burner. Open pans of quicklime are placed in the test chamber when very low relative humidity is desired and the door is cushioned with felt to make it nearly air tight. The outer walls of the chamber are insulated with asbestos board bolted in place. A shallow tray the length of the chamber and narrow

enough to pass freely through door facilitates introducing and removing material. This apparatus costs about \$10.00 including the thermostat. A nearly constant humidity of 89% varying but two degrees has been maintained for one week and a minimum humidity of about fourteen degrees varying three degrees has been maintained for four days. The results so far indicate that this apparatus, with slight alteration, can be used to determine the effects of certain environmental factors which could not be determined in the field. Field notes checked with a thermohygrograph introduce so many variables and these variables of such extremely short periods of constancy as to render any conclusions extremely difficult. The use of the mean temperature and mean humidity over a given period of time, though undoubtedly decidedly significant, certainly does not take into consideration the frequency of thermic and hygric variations. That this frequency is as important as the mean or the maximum and minimum extremes has as much ground as any of the other theories advanced upon this subject. The economic importance of such knowledge is inestimable. Through the past fifty years, field observations on the Hessian Fly have brought no conclusive means of foretelling the time of fly emergence. The same lack of results may be observed in almost any continued study of insects in the field. Their time of appearance and time of activity vary from year to year. These variations are undoubtedly due to climatic conditions and until we can positively say what climatic conditions and what combinations of climatic conditions will produce a given effect, we cannot hope to prognosticate insect outbreaks. The great expense attached to constructing all the apparatuses heretofore described place such experimental work without the scope of the average field worker. So far we have made but few tests. However, as these are so significant it may be of interest to review them here.

Experiments were made with larvae of *Agriotes mancus* a common wireworm crop pest, these larvae being used in each experiment except (A) in which ten larvae were used. These larvae were all from material that has been under observation at least one year and up to the time of the experiments had been exposed to almost identical environmental conditions.

Experiment	Temperature	Relative humidity	Duration	Effect
A	71-86°	submerged	30 days	Not fatal
I	80°	44%	8 hours	do.
II	100°	56%	2½ "	Fatal
IV	120°	24%	1½ "	do.
VII	105°	89%	5½ "	do.
VIII	60-80°	89%	21 days	Not fatal

With but a single point in each limiting zone a most interesting chart can be plotted. The relative arc of course is entirely hypothetical and can only be defined by repeated experimentation to place additional points of determination. Once determined, each zone will probably assume the form of an ellipse as suggested by Pierce. That these curves take approximately the general direction indicated is quite evident, however, and it appears from these observations (which are only given to illustrate the application of the data and not as positive statements relative to the material treated) that this insect has an optimum sphere lying between 50% and 80% relative humidity and between 55° and 75° F. temperature and a sphere of instant fatality lying without 10% relative humidity at temperatures below 60° F. and above 120° F. with relative humidity above 24%. These conclusions, though so hastily drawn, are borne out by the observations of the past three seasons on material in our rearing cages. In the early summer we have a period of high activity of *Elaterid* larvae, indicated by molting and pupating; as the temperature rises we have a period of relative inactivity followed by a lesser period of activity in the cooler days of early fall, which is in turn followed by a very inactive period covering the cold weather.

[Signed] J. A. Hyslop.

NEWS ITEMS FROM FOREST GROVE (OREGON) FIELD STATION.

September 20, 1916.

The present season appears to have been an unusually favorable one in the Pacific northwest for the development of both the clover flower midge (*Dasyneura leguminicola*) and *Aphis bakeri*. In red clover fields where the hay crop was not cut until late June or early July, both of these insects are present in destructive abundance, and the seed crop is so small and of so poor a quality that the farmers consider it hardly worth harvesting. Fortunately, however, the majority of the clover seed growers of Oregon and Washington cut their hay crop early in June, as advised by this station, with the result that their seed crop has not only been free from midge but also *Aphis bakeri*, and seed yields varying from three to eight bushels per acre have been obtained. We would be glad to hear from men at other stations and to know whether or not early cutting of the clover hay crop has proved effective as means of controlling *Aphis bakeri* in their respective localities.

[Signed] C. W. Creel.

NEWS ITEMS FROM TEMPE (ARIZ.) FIELD STATION.

October 20, 1916.

The nights of the past month have been especially cool for this season of the year, and insects have been correspondingly quiet in this section of the country.

Aphis maidis has made its usual fall flight from corn to the newly seeded barley crop.

The fall army worm (*Laphygma frugiperda*) has apparently terminated its activities for the year one brood earlier than was characteristic for the fall of 1915.

[Signed] V. L. Wildermuth.

